

REMARKS

Claims 1-11 are pending in the application. Herein, applicant amends claim 1, with claims 2-11 remaining as originally filed.

In paragraph 1 of the office action, the Examiner invites the applicant to carefully review the specification for minor errors. The applicant respectfully requests that minor amendments to the specification, if needed, be done after the examiner has indicated the claims have allowable subject matter.

Response to §102 Rejection

In paragraph 2 of the office action, the Examiner rejects claims 1-3, 5-7, 9, and 10 under 35 U.S.C. §102(b), as being anticipated by U.S. patent no. 5,459,478 (Bolger). In response, the applicant amends independent claim 1 to expressly state the field effect transistor is "supplying a constant output current to said light emitting diode." Figure 8 of the application (duplicated below), is useful to illustrate an example of the system for current regulation of claim 1.

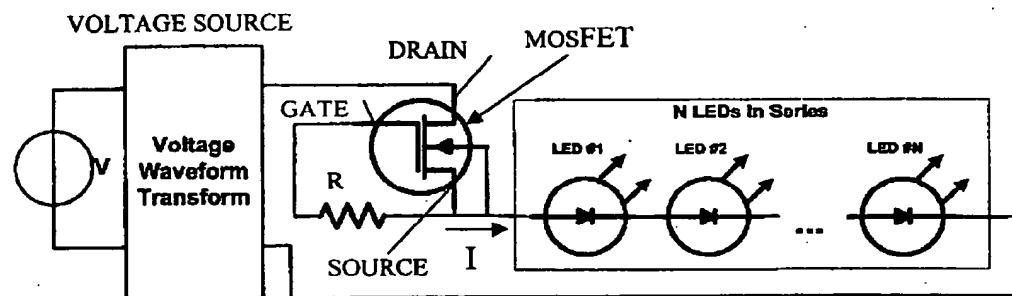


Figure 8 from Specification, with added annotations

As shown in Figure 8, the system has a voltage source electrically connected to one or more LED's. An FET (shown as a MOSFET device), electrically connects to the voltage source. The FET is arranged so that an electrical path is established from the SOURCE, through the LEDs, and back to the DRAIN. More particularly, the SOURCE supplies an output current "I" into the LED or the set of series LEDs. This output current I is kept constant according to the junction voltage between the GATE and the SOURCE. A resistor R is sized to set the junction voltage, and the level of the constant current. As more fully described in the following excepts from paragraphs 0028 and 0029 of the application:

In this Active region, the FET serves as a current source to a series load, since the output current I_D is determined solely by the FET internal junction voltage V_{GS} .

The effect of the FET current regulator is to clamp the current to the maximum value of I_D set by the Gate-Source voltage V_{GS} . The value of V_{GS} is fixed by the FET device properties and the regulating resistor which, in turn, may be a simple wire or zero resistance.

In contrast, Bolger does not have an FET that operates to supply a constant current as recited in claim 1. Instead, the FET of Bolger operates as a mere switch, as described in the following excepts from column 4 of Bolger:

When the input

5 voltage is in the first range, Zener diode D4 will be turned OFF and no control voltage will be applied to the gate electrode of the transistor Q1. Therefore, the transistor Q1 will be turned OFF.

When the input

20 voltage is in the second range, the Zener diode D4 will be turned ON and the control voltage across the resistor R4 will exceed the threshold voltage of the transistor Q1. Accordingly, the transistor Q1 will be turned ON.

In Bolger, it is not the FET Q1 that supplies a constant current, but it is the switching regulator 24. As described at col. 3, lines 5-8 of Bolger:

The switching regulator device 24 is operatively connected so as to serve as a constant current source.

And further illustrated in this excerpt from column 4 of Bolger:

the switching regulator device
24 will cause the output current to be increased to approximately 100 mA. This creates the second higher constant
30 current level which flows through the LED display device 12 so as to produce the bright intensity.

As described above, Bolger fails to disclose any FET that supplies a constant output current to a light emitting diode, as recited in claim 1. Since Bolger fails to disclose all the limitation of claim 1, the applicant respectfully submits that Bolger does not anticipate independent claim 1, or its dependent claims 2-3, 5-7, 9, and 10.

Response to §103 Rejection

In paragraph 3 of the office action, the Examiner rejects claims 4 and 11 under 35 U.S.C. §103(a), as being unpatentable over U.S. patent no. 5,459,478 (Bolger) in view of U.S. patent no. 6,748,180 (Feng). As described more fully above with reference to claim 1, Bolger fails to disclose all the limitations of dependent claims 4 and 11. Feng does not overcome the deficiencies of Bolger, as Feng also fails to disclose any FET that supplies a constant output current to a light emitting diode. Instead, Feng uses a capacitor to regulate LED driving current. As stated in the Abstract of Feng:

A high efficiency light emitting diode (LED) driver circuit utilizes a capacitor to regulate the LED driving current. The voltage across the capacitor is monitored to maintain a preselected low threshold voltage on the capacitor, which determines the LED optical emission intensity. The capacitor provides the LED driver current by discharging through the LED during transmission intervals, and the power supply for the device is used only to maintain the capacitor charge level.

As described above, Bolger and Feng, either alone or in combination, fail to disclose any FET that supplies a constant output current to a light emitting diode, as recited in claims 4 and 11. Since Bolger and Feng fail to disclose all the limitations of claims 4 and 11, the applicant respectfully submits that a prima facie case of obviousness has not been made. Accordingly, claims 4 and 11 are not rendered obvious in view of Bolger and Feng.

In paragraph 4 of the office action, the Examiner rejects claim 8 under 35 U.S.C. §103(a), as being unpatentable over U.S. patent no. 5,459,478 (Bolger). As described more fully above with reference to claim 1, Bolger fails to disclose all the limitations of dependent claim 8. More particularly, Bolger fails to disclose any FET that supplies a constant output current to a light emitting diode, as recited in claim 8. Since Bolger fails to disclose all the limitations of claim 8, the applicant respectfully submits that a prima facie case of obviousness has not been made. Accordingly, claim 8 is not rendered obvious in view of Bolger.

Conclusion

The applicant has reviewed the prior art made of record and not relied upon, and believes the pending claims are patentably distinguishable from all cited art. The applicant respectfully submits that pending claims 1 - 11 are now in a condition for allowance. Any questions regarding this application may be directed to the undersigned.

Respectfully submitted,

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